REMARKS

Claim Status, Amendments and Support

Claims 1-35 were originally presented and claims 10-22, 26-28 and 31-34 were previously withdrawn due to restriction requirement and election. Claims 1-9, 23-25, 29, 30 and 35 were under examination as of the Office Action dated November 12, 2010. Claim 1 is amended and claims 35 are canceled herein. The amendment to claim 1 adds the elements of claim 35 to the base claim with the emphasis that the FSC and CRC are measured with 0.9% saline as taught in the specification. Hence no new matter is introduced by the amendment. Claims 1-9, 23-25, 29 and 30 are therefore pending.

In the office action dated November 12, 2010, the Office took the following actions:

1. The rejection of claims 2, 3 and 30 under 35 USC, § 112, second paragraph, was withdrawn.

2. Claims 1-9, 23-25, 29, 30 and 35 were newly rejected over Grossmann et al (*Carbohydrate Polymers 45, 2000, 347-353)* as evidenced by Sigma Aldrich (PTO-892) in view of Hirsch et al (*Cereal Chemistry, 2002)* and further in view of Feil (EP 0900807).

Based on the foregoing amendments and following remarks, Applicants requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Obviousness Rejections

Claim 1 has been amended in earnest attempt to advance prosecution of to the present application to allowance over the art of record. In particular, claim 1 has been amended to further require that the absorbent particles made of entangled starch network derived from extrusion of starch having at least 90% amylopectin also must have a particle diameter of 89-589 μm and further that they exhibit a FSC of at least 13 g/g and a CRC of at least 10 g/g using a 0.9% saline solution. These are critical functional requirements that have been determined by Applicants tedious experimentation to produce results that cannot fairly be said to be obvious over the art of record.

In particular, the Office is invited to inspect the data in tables 7 and 8, which show that for either cross-linked or non cross linked extruded high amylopectin starch, particles having a size greater than 589 μm, or those having a particle size of less than 89 μm each failed to deliver

the combination of both the required FSC and CRC values. FSC and CRC are critical functional parameters in the absorbent industry, because if the particles cannot absorb at least 13 times their weight of saline fluid and retain at least 10 times their weight in the centrifuge test, then such particles derived from a renewable resource such as starch, will not be suited for displacing non renewable petroleum based polyacrylate superabsorbent particles (SAPs) in the absorbent industry because conventional SAPs demonstrate at least this level of performance.

The cited art does render the present combination claims obvious at least because Applicants' invention is in the context of a specific problems with specific solutions, while the references that were cited for disclosing different elements of the present claims were presented in different contexts. The problem being addressed by the present invention is how to formulate a particle from a starch that can be used as a substitute for SAPs derived from polyacrylates. One component of the solution is recognizing that high amylopectin starch – waxy starch - when prepared as pregelatinized or post gelatinized particles can absorb more fluids than other types of starch (e.g., cassava or other ordinary i.e., primarily amylose containing starch). Another component of the solution was discovering that pregelatinized or post gelatinized particles can be made efficiently using an extruder which provides shear forces and temperature conditions that cause the naturally highly branched amylopectin to become further intertwined in a starch network. Yet another component of the solution was in discovering that the particle size distribution for such particles must be delimited on both the high and low ends to obtain particles with a FSC of at least 13 g/g and a CRC of at least 10 g/g.

In contrast, the teaching of Grossmann, which was cited for the proposition that starch can be cross linked in an extruder, was concerned with problem of making a specialty food ingredient from cassava starch which was known to have negative characteristics such as long texture, sensitivity to shear, high temperature and low pH (first paragraph Introduction). Grossmann's solution to that problem was to use an extruder to perform a cross-linking reaction with trisodium metaphosphate to form a cross linked cassava starch product. The starch used was ordinary cassava starch obtained from Brazil (materials and method first paragraph). One of ordinary skill in the art understands that ordinary cassava starch is not waxy starch containing at least 90% amylopecitin but is typical of ordinary starches being composed of 17-28% amylose (see for example (http://www.starch.dk/isi/applic/tapiocafood.htm%.). The water absorption index (WAI) and viscosity properties of a paste of the cross linked material were measured (see Table 2 and

section 3.3 of Grossman). An increase in viscosity and WAI were viewed as positive characteristics for the starch as a food product. Nothing in the data or text of this reference, however, teaches anything that would lead one of ordinary skill in the art of absorbent materials to believe that the cross linked starch made by reactive extrusion according to Grossman would have the properties needed to form an absorbent particle with a free swell capacity to absorb at least 13.g/g of a saline solution. Moreover, Applicants are skilled in the art of using extruders to produce modified starches and know that ordinary starch subject to reactive extrusion including cross linking with trimetaphosphate does not alone produce a material that would form a particle having a FSW of at least 13 g/g and a CRC of at least 10 g/g. Other factors are required.

Hirsh does not cure the deficiency of the teaching of Grossmann with respect to the use of an extruder to form an entangled starch network of waxy starch to form a starch particle that has absorbent properties. The context of Hirsh is the mechanism of cross linking. The reference merely presents data concerning the properties waxy starch that has been subject to of linking reactions with phosphorous oxychloride, sodium trimetaphoshpate or epichlorohydrin. The data in the reference merely discloses numbers for was already known in the art, i.e., that cross linking any starch increases the swelling ability of starch granules. Nothing in the data however, would make it obvious to use cross linked amylopectin to form an absorbent particle that would have a FSW of at least 13 g/g and a CRC of at least 10 g/g. let alone that using an extruder to form such a cross linked amylopectin would improve absorbent properties only if the starch particles are in the range of 89 μm to 589 μm in size. This is Applicant's empirical discovery, not something that can reasonably be considered as obvious from the teaching of Hirsh and Grossman.

Feil was cited as teaching that water absorbing cross linked starch can be sued as an ingredient to form absorbent materials. Applicants admit that it was known in the art at the time of filing that as taught by Hirsh and Grossman, cross linked starches have higher water absorbent properties than non cross linked starches. Feil adds nothing more to this understanding other than the observation that particles of 300-400 um size had an absorption capacity (FSC) y of 12/g/g iof 0.9% saline (Column 5, lines 25-32 and 48-51). Nothing in Feil, alone or in combination with Grossmann and Hirsh would make it obvious that the absorption capacity could be increased by using at least 90% amylopectin as the starting starch source, or that use of an extruder to entangle the amylopecitn starch fibers into a network would increase the FSC and CRC properties of starch particles having a dimension of 89 μm to 589 μm. Again, this is an understanding gleaned from

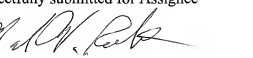
Applicant's invention, which is not suggested and cannot otherwise be said to be an obvious conclusion that one of ordinary skill in the art would draw from reading the combination of Feil, Hirsh and Grossmann

Accordingly, Applicant's amended claims cannot be considered an obvious variation of what was known in the cited art at the time of filing that would obviously yield a predictable result as KSR requires to establish a *prima facie* case of obviousness. Applicants therefore request withdrawal of the rejection of the pending claims on this ground. .

Summary

With the enclosed amendment all of the rejections are believed to have been rebutted, accommodated or rendered moot. Entry of the amended claims as well as reconsideration and allowance of all of the claims are respectfully requested. If the examiner believes that a telephone conference might resolve any outstanding issues in this application, he is encouraged to call the undersigned.

Respectfully submitted for Assignee



Dated: April, 12, 2011 Mark W. Roberts Reg. No. 46,160

Please note change in Power of Attorney and direct all future correspondence to

Mark W. Roberts
Registration No. 46,160
Archer Daniels Midland Company
Law Department
4666 Faries Parkway
Decatur, IL 62526
Telephone: (217) 451-3170
Facsimile: (217) 451-5100